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Informational Testimony
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How do we know that exposures at work effect the health of workers?

Studies use epidemiologic methods to establish whether or not an exposure leads to the causation of a disease. Exposure to almost any chemical or biological substance can cause disease given a large enough dose. Epidemiologists define dose in terms of how much, how often, and how long. Considering that the average full-time worker works 2,080 hours a year over a 30-year career the dose of occupational exposures can be large.

In fact, much of what we know today about the causation of disease due to chemical and biologic substances comes from epidemiologic studies conducted among groups of workers.

What are firefighters exposed to at work?

Job hazards of firefighters can include structural hazards, chemical exposures, diesel exhaust, emergency response hazards, fire-damaged floor, and job stress.[1] Due to the uncontrolled and unpredictable nature of their work, fire fighters are exposed to a wide variety of known carcinogens. Many chemicals found in the fire fighting environment are considered to be known or probable human carcinogens by the authoritative World Health Organization's International Agency for Research on Cancer (IARC).[2] These agents are listed in the table below:

Group 1 Agents Known to cause cancer in humans	Group 2A Agents Probable human carcinogens
Respiratory cancers • Arsenic • Asbestos • Benzo[a]pyrene • Cadmium • Dioxin • Soot • Diesel engine exhaust	• Creosote • Wood combustion by-products • Lead • Polychlorinated biphenyls (PCBs) • Tetrachloroethylene • Trichloroethylene
Other cancer types • Benzene • 1,3-butadiene • Formaldehyde • Radioactivity and radionuclides • Sulfuric acid • Vinyl Chloride • Hepatitis B and C	

What scientific evidence demonstrates that firefighters are at greater risk for respiratory cancer?

Several studies have documented increased respiratory cancers among firefighters. Of note are two high-quality studies that have established that cancers of the lungs are associated with occupational exposures firefighters experience. The first study examined cancer in 30,000 career firefighters from San Francisco, Chicago and Philadelphia and is one the largest studies of US firefighters to date.[3] The second study examined over 16,000 firefighters in five Nordic countries. The Nordic countries have been collecting data on cancer through census dates for nearly 50 years. This study took dates from 1961-2005.[4]

- These studies found that firefighters had a greater number of cancer diagnoses[3,4] and cancer-related deaths.[3]
- Both studies found that there were twice as many firefighters with malignant mesothelioma. Mesothelioma is a rare type of cancer that affects the lining of the lungs and is caused by exposure to asbestos.
- The studies found that there was an increased number of lung cancers diagnoses and deaths. Additionally, the chance of lung cancer diagnosis or death increased with the amount of time firefighters spent at fires.[3]

How many respiratory cancers among firefighters would be expected in Montana?

- Among the general population in Montana there are about 357 lung cancers and 11 mesothelioma cases diagnosed among men each year.[5]
- The state of Idaho estimated that among their 2,700 male professional firefighters there would be about 3 lung cancers and less than 1 mesothelioma cases diagnosed in the first 5-years of their presumptive legislation. Montana and Idaho have similar incidence rates of lung cancer and mesothelioma.[5]

What is the average cost of cancer treatment?

- For lung cancer among men, the first year of treatment costs, on average, $60,701. The cost for treatment in the last year of life is about $116,596.[6] Successfully treating lung cancer greatly depends upon the extent of the disease when it is first diagnosed, however, approximately 19% of lung cancer patients survive for 5-years after diagnosis.[7]
- National cost estimates for the treatment of mesothelioma are not available.
- Mesothelioma is a difficult cancer to treat; according to the National Cancer Institute only 5%-10% of patients survive 5 years after diagnosis.

Which non-cancerous respiratory diseases are firefighters at risk for?

Fire fighters are exposed to smoke and other toxicants as part of their job. Smoke contains particulates and gases that are irritating to the lungs and upper respiratory tract. These irritants are the products of combustion from both synthetic (plastics) as well as natural products (wood).

A number of studies have documented decreased lung function among fire fighters as a short-term effect of inhalation of smoke. Studies of the long-term effects of repeated exposure to smoke have not been conclusive. The scientific literature is relatively sparse in providing evidence linking non-cancerous disease outcomes with the occupational exposures of firefighters.

One respiratory conditions that may be associated with firefighting is asthma.[8]

- 9% of adults in Montana have asthma.[9]
- 25% of adult-onset asthma cases are due to occupational exposures.[10]
- According to the Centers for Disease Control and Prevention, medical expenses for asthma cost about $3,300 per person each year.[11]

Have studies found firefighters to be at risk for other types of cancers?

Risk among fire fighters was increased overall or in a specific age groups for the following cancers (listed in no particular order):[1,2,12]

- Colon
- Melanoma
- Multiple Myeloma
- Non-melanoma skin cancer
- Prostate
- Rectal
- non-Hodgkins lymphoma
- Stomach

Are there other illnesses that firefighters are at an increased risk for because of their jobs?

Heart attack and other sudden cardiac events are the most common cause of death among fire fighters.[1]

Citations

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